

## 11/26/13 Agenda

- Warm Up
- Review Tryin' for Triangles Activity
- Section 5.5 - Triangle Inequalities
- Work on Worksheet 7, whatever you don't finish is homework

## Warm Up - Can these lengths be made into a triangle

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1, 1, 1	2, 1, 1	3, 1, 1	4, 1, 1	5, 1, 1	6, 1, 1
1, 1, 2	2, 1, 2	3, 1, 2	4, 1, 2	5, 1, 2	6, 1, 2
1, 1, 3	2, 1, 3	3, 1, 3	4, 1, 3	5, 1, 3	6, 1, 3
1, 1, 4	2, 1, 4	3, 1, 4	4, 1, 4	5, 1, 4	6, 1, 4
1, 1, 5	2, 1, 5	3, 1, 5	4, 1, 5	5, 1, 5	6, 1, 5
1, 1, 6	2, 1, 6	3, 1, 6	4, 1, 6	5, 1, 6	6, 1, 6
1, 2, 1	2, 2, 1	3, 2, 1	4, 2, 1	5, 2, 1	6, 2, 1
1, 2, 2	2, 2, 2	3, 2, 2	4, 2, 2	5, 2, 2	6, 2, 2
1, 2, 3	2, 2, 3	3, 2, 3	4, 2, 3	5, 2, 3	6, 2, 3
1, 2, 4	2, 2, 4	3, 2, 4	4, 2, 4	5, 2, 4	6, 2, 4
1, 2, 5	2, 2, 5	3, 2, 5	4, 2, 5	5, 2, 5	6, 2, 5
1, 2, 6	2, 2, 6	3, 2, 6	4, 2, 6	5, 2, 6	6, 2, 6
1, 3, 1	2, 3, 1	3, 3, 1	4, 3, 1	5, 3, 1	6, 3, 1
1, 3, 2	2, 3, 2	3, 3, 2	4, 3, 2	5, 3, 2	6, 3, 2
1, 3, 3	2, 3, 3	3, 3, 3	4, 3, 3	5, 3, 3	6, 3, 3
1, 3, 4	2, 3, 4	3, 3, 4	4, 3, 4	5, 3, 4	6, 3, 4
1, 3, 5	2, 3, 5	3, 3, 5	4, 3, 5	5, 3, 5	6, 3, 5
1, 3, 6	2, 3, 6	3, 3, 6	4, 3, 6	5, 3, 6	6, 3, 6
1, 4, 1	2, 4, 1	3, 4, 1	4, 4, 1	5, 4, 1	6, 4, 1
1, 4, 2	2, 4, 2	3, 4, 2	4, 4, 2	5, 4, 2	6, 4, 2
1, 4, 3	2, 4, 3	3, 4, 3	4, 4, 3	5, 4, 3	6, 4, 3
1, 4, 4	2, 4, 4	3, 4, 4	4, 4, 4	5, 4, 4	6, 4, 4
1, 4, 5	2, 4, 5	3, 4, 5	4, 4, 5	5, 4, 5	6, 4, 5
1, 4, 6	2, 4, 6	3, 4, 6	4, 4, 6	5, 4, 6	6, 4, 6
1, 5, 1	2, 5, 1	3, 5, 1	4, 5, 1	5, 5, 1	6, 5, 1
1, 5, 2	2, 5, 2	3, 5, 2	4, 5, 2	5, 5, 2	6, 5, 2
1, 5, 3	2, 5, 3	3, 5, 3	4, 5, 3	5, 5, 3	6, 5, 3
1, 5, 4	2, 5, 4	3, 5, 4	4, 5, 4	5, 5, 4	6, 5, 4
1, 5, 5	2, 5, 5	3, 5, 5	4, 5, 5	5, 5, 5	6, 5, 5
1, 5, 6	2, 5, 6	3, 5, 6	4, 5, 6	5, 5, 6	6, 5, 6
1, 6, 1	2, 6, 1	3, 6, 1	4, 6, 1	5, 6, 1	6, 6, 1
1, 6, 2	2, 6, 2	3, 6, 2	4, 6, 2	5, 6, 2	6, 6, 2
1, 6, 3	2, 6, 3	3, 6, 3	4, 6, 3	5, 6, 3	6, 6, 3
1, 6, 4	2, 6, 4	3, 6, 4	4, 6, 4	5, 6, 4	6, 6, 4
1, 6, 5	2, 6, 5	3, 6, 5	4, 6, 5	5, 6, 5	6, 6, 5
1, 6, 6	2, 6, 6	3, 6, 6	4, 6, 6	5, 6, 6	6, 6, 6

## Section 5.5 - Triangle Inequalities

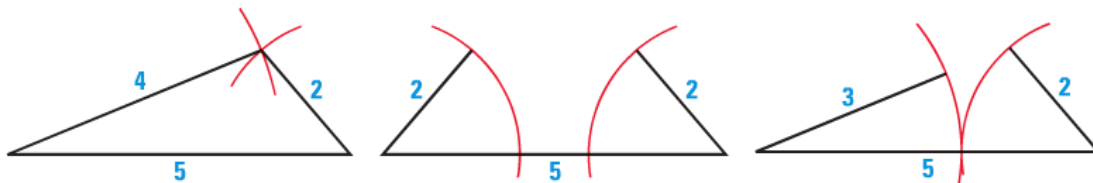
Targets 5F & 5G

Goals:	<p>Apply the Triangle Inequality.</p> <p>Apply relationships between the length of a triangles sides and the size of it's angles.</p> <p>-----</p>
Today's Takeaways:	<p>1. Determine if three side lengths can form a triangle.</p>
SWBAT	<p>2. Given dimensions of 2 sides of a triangle, find the range of dimensions for the third side.</p> <p>3. Be able to relate side length and angle measures within a triangle.</p>

**Goal 1. Determine if three side lengths can form a triangle.**

**THE TRIANGLE INEQUALITY** Not every group of three segments can be used to form a triangle. The lengths of the segments must fit a certain relationship.

For example, three attempted triangle constructions for sides with given lengths are shown below. Only the first set of side lengths forms a triangle.



If you start with the longest side and attach the other two sides at its endpoints, you can see that the other two sides are not long enough to form a triangle in the second and third figures. This leads to the *Triangle Inequality Theorem*.

### THEOREM

### For Your Notebook

#### THEOREM 5.12 Triangle Inequality Theorem

The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

$$AB + BC > AC$$

$$AC + BC > AB$$

$$AB + AC > BC$$

Proof: Ex. 47, p. 334



**Hint:**

**Add the 2 smaller sides together. If the sum is less than the length of the third side, you can create a triangle.**

Examples: Can the following lengths be made into a triangle?

1.) 5, 4, 3  $4+3=7 > 5$   
YES

2.) 15, 7, 7  $7+7=14 < 15$   
15, 7, 8 NOT

3.) 12, 17, 7 YES

4.) 215, 6, 210  $210+6=216 > 215$   
YES

*Goal 2: Given dimensions of 2 sides of a triangle, find the range of dimensions for the third side.*

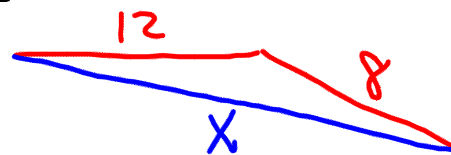
If a triangle has one side length of 12 and another side length and 8, what are the possible lengths of the third side?



$$\begin{array}{r} x+8 > 12 \\ -8 \quad -8 \\ \hline \end{array}$$

$$x > 4$$

AND



$$12+8 > x$$

$$20 > x \quad 4 < x < 20$$

Examples: Given the lengths of 2 sides, determine the possible lengths of the third side.

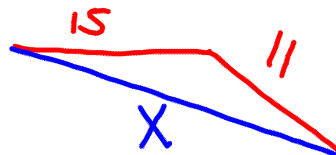
DIFFERENCE  $< x <$  SUM OF 2 SIDES OF 2 SIDES

1.) 11 and 15



$$\begin{array}{r} x+11 > 15 \\ -11 \quad -11 \\ \hline \end{array}$$

$$x > 4$$



$$15+11 > x$$

$$26 > x$$

$$4 < x < 26$$

2.) 15 and 15

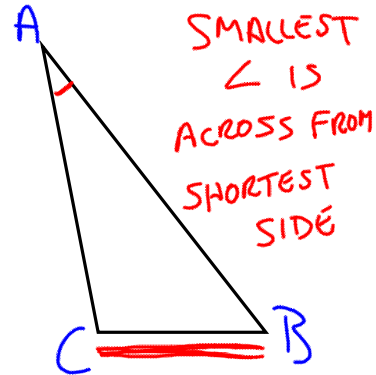
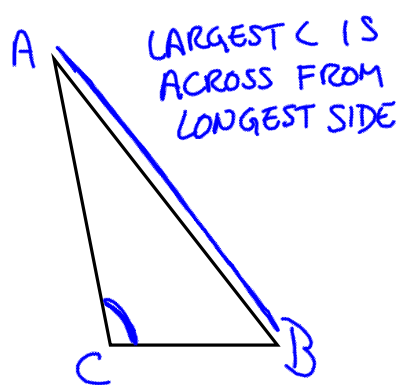


$$x > 0$$

$$x < 30$$

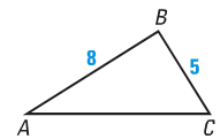
$$0 < x < 30$$

*Goal 3: Be able to relate side length and angle measures within a triangle.*

**THEOREMS***For Your Notebook***THEOREM 5.10**

If one side of a triangle is longer than another side, then the angle opposite the longer side is larger than the angle opposite the shorter side.

*Proof:* p. 329

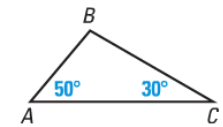


$AB > BC$ , so  $m\angle C > m\angle A$ .

**THEOREM 5.11**

If one angle of a triangle is larger than another angle, then the side opposite the larger angle is longer than the side opposite the smaller angle.

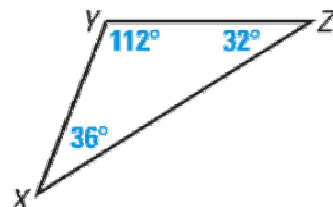
*Proof:* Ex. 24, p. 340



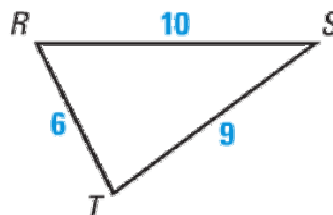
$m\angle A > m\angle C$ , so  $BC > AB$ .

Examples:

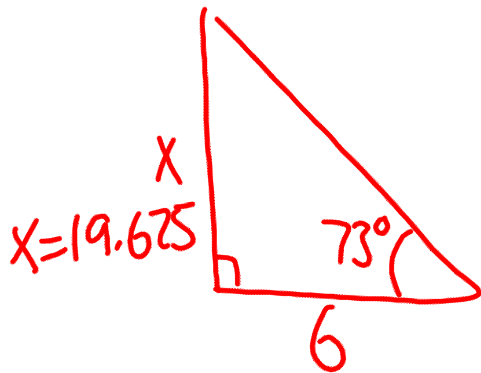
**WRITING MEASUREMENTS IN ORDER** List the sides and the angles in order from smallest to largest.



$\angle Z, \angle X, \angle Y$   
 $\overline{XY}, \overline{YZ}, \overline{XZ}$



SOHCAHTOA



FIND THE LENGTH OF  $X$

$$\frac{X}{6} = \tan(73)$$

$$\sqrt{-1} \quad 2^3 \sum \pi$$

AND IT WAS DELICIOUS!